

OIL/WATER SEPARATORS

UNDERGROUND FIBERGLASS STORAGE TANKS



CONTAINMENT
SOLUTIONS®

FIBERGLASS UNDERGROUND OIL/WATER SEPARATORS

Containment Solutions, Inc. (CSI) provides a full range of dependable products for the oil/water separator industry. Our underground separators utilize the same fiberglass manufacturing technology the petroleum industry relies on for environmental protection. The inherently non-corrosive properties of fiberglass provide the most compatible option for your separator application, built by one of the most trusted brands in the world.

CSI separators are constructed to remove hydrocarbons with a specific gravity up to 0.95 through the use of an enhanced oleophilic coalescer pack system. Oil/water separator designs vary based on required effluent quality and flow rates. An effluent quality of 10 parts per million (10ppm) is typical but the difference between continuous flow and intermittent flow will drastically alter the coalescer pack sequence. CSI provides several options in both single and double-wall construction to meet your unique needs.

For the ultimate in performance, look no further than the CSI UL 2215 separator. The UL 2215 model is a premium oil/water separator that meets not only construction requirements, but has unparalleled performance testing under both simulated operating conditions and working conditions. Our UL model takes separators to a new level of effluent quality. The UL systems are designed for continuous flow, which is a significant distinction when comparing oil/water separator products. Most products on the market are only engineered for intermittent flow. For intermittent flow applications we offer CSI-10 and CSI-15 models.

SYSTEM PROCESS

CSI fiberglass separators are buried and filled with water. Each separator includes a combination of baffles and coalescer packs, based on effluent requirements, to accelerate separation. Waste water enters through the inlet and gravity naturally settles heavier solids to the bottom of the tank as the oil floats to the top of the water level. The oily water then passes through the coalescing plates in a straight flow or cross flow direction depending on the tank model. The configuration of the packs efficiently coalesces or joins oil droplets together forming larger masses of oil that rise to the surface where it accumulates and can be removed. Gravity displacement discharges the effluent through the outlet at a lower point in the tank chamber. Separator systems can also be equipped with electronic monitoring with high oil level alarms, oil stop valve, and control panel.



PERFORMANCE CLAIMS:

- Fiberglass construction provides corrosion resistance without coatings or protection systems.
- Enhanced coalescer system is comprised of oleophilic plates to maximize separation and minimize maintenance.
- Removable plates simplifies routine cleaning.
- All tanks are built to the stringent performance requirements of UL 1316.
- Removes free floating oils and settleable solids for oil/water mixtures to achieve 10ppm effluent quality (or 15 ppm if specified).
- Includes a 30-year internal / external corrosion and structural warranty.

SEPARATOR DESIGN & SIZING

Since each site is unique, the most effective approach is to analyze each situation and design the system accordingly. CSI's engineering staff can help determine the best fit for your technical considerations and site specific needs.

The major design parameters include:

<i>Inlet flow rates</i>	<i>Oil spill capacity</i>
<i>Inlet/outlet concentration</i>	<i>Oil storage capacity</i>
<i>Effluent quality</i>	<i>Temperature</i>
<i>Specific gravity of contaminants</i>	

UL 2215 separators are sized primarily on flow rates. A complete list of flow rate plate pack options are available, contact your CSI representative for more information.

INTERCEPTORS

In addition to separators, interceptors are available in single, double, and triple basin designs. CSI interceptors reduce sand, settleable materials, and oil or grease prior to sewer discharge. CSI interceptors can be used as stand alone units or as the initial stage of a more efficient treatment system utilizing CSI oil/water separators.

PERFORMANCE	MODELS			
	UL 2215	CSI-10	CSI-15	Interceptor
Stokes' Law	●	●	●	●
ASTM D-4021	●	●	●	●
UL 1316	●	●	●	●
API 1630	●	●	●	
API 421	●	●	●	
USCG 46CFR 162.050	●	●	●	
15ppm	●	●	●	
10ppm	●	●		
UL 2215	●			
Continuous Flow	●			

ELECTRONICS / ACCESSORIES

Oil/Water Separator monitoring and control systems can be configured to satisfy a wide range of customer requirements. Control panels, sensors, probes and gauges are available for double-wall and single-wall oil/water separator systems as well as for single-tank or multiple-tank installations. CSI carries a full line of pump controls, inlet and outlet pumps, and waste oil pumps. We can package the right model with the proper electronics so when the tank arrives the only thing left to do is connect the piping.



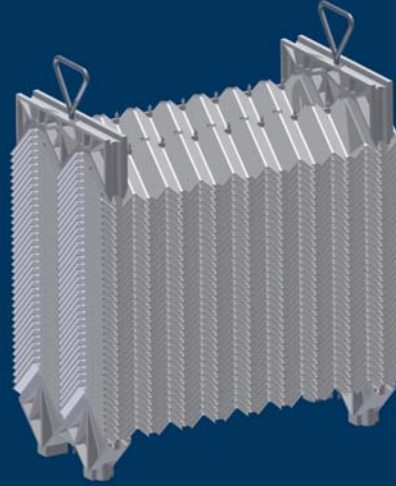
APPLICATION: RAINWATER RUNOFF

Oil drippings and spills from parking lots, driveways, oil terminals and other vehicular traffic surfaces are being washed into our water supplies by rainwater, creating serious environmental concerns.

CSI Oil/Water Separators are designed to meet EPA guidelines for rainwater runoff control.

TYPICAL FEATURES

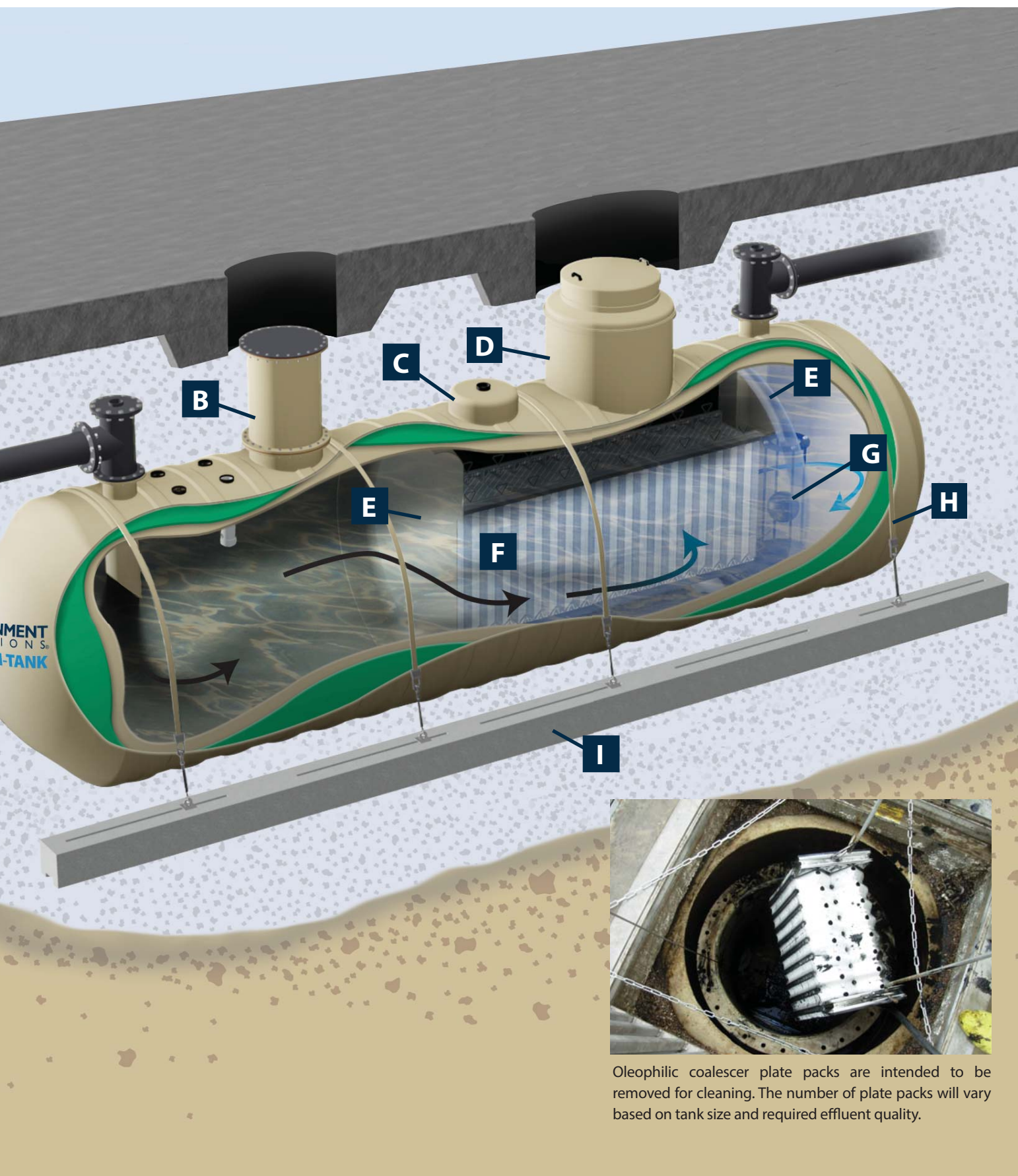
- A. Double-Wall Separator
- B. FRP Manway Extension
- C. Hydrostatic Reservoir
- D. Tank Sump
- E. Cross flow Baffle
- F. Coalescer Plate Packs
- G. Oil Stop Valve
- H. Anchor Straps
- I. Deadman Anchor System



The unique cross flow design of the UL 2215 model results in the most efficient use of the corrugated plate pack.

TANK DIMENSIONS for CSI-10 & CSI-15 Models

	Nominal Capacity (gallons)	Flow Rate (gpm)	Oil Storage Capacity (gallons)	Oil Spill Capacity (gallons)	Inlet / Outlet (sizes)	Nominal Length		Nominal Weight (lbs)	
						Single-Wall	Double-Wall	Single-Wall	Double-Wall
4' Dia.	550	55	110	440	4"	9'8"	9'9"	425	900
	1,000	100	200	800	4"	11'	11'1"	500	1,050
	1,500	150	300	1,200	4"	16'10"	16'11"	750	1,275
6' Dia.	2,000	200	400	1,600	6"	13'10"	13'8"	1,000	2,275
	3,000	300	600	2,400	6"	16'	16'9"	1,075	2,750
	4,000	400	800	3,200	6"	19'8"	19'9"	1,475	2,975
	5,000	500	1,000	4,000	8"	24'8"	25'	1,800	3,475
	6,000	600	1,200	4,800	8"	29'6"	30'3"	2,100	3,900
	6,000	600	1,200	4,800	8"	19'5"	19'6"	2,300	4,200
	7,000	700	1,400	5,600	8"	22'2"	23'7"	2,650	4,675
8' Dia.	8,000	800	1,600	6,400	10"	24'11"	26'4"	2,950	5,075
	9,000	900	1,800	7,200	10"	27'8"	27'9"	3,300	5,450
	10,000	1,000	2,000	8,000	10"	30'5"	30'6"	3,550	5,950
	12,000	1,200	2,400	9,600	10"	35'11"	36'	4,375	7,000
	15,000	1,500	3,000	12,000	12"	44'5"	44'6"	5,350	8,650
10' Dia.	20,000	2,000	4,000	16,000	14"	37'8"	37'9"	6,950	11,900
	25,000	2,500	5,000	20,000	16"	45'11"	46'	8,300	13,900
	30,000	3,000	6,000	24,000	16"	54'2"	54'3"	9,600	16,300
	40,000	4,000	8,000	32,000	20"	71'3"	71'4"	12,650	20,975



Oleophilic coalescer plate packs are intended to be removed for cleaning. The number of plate packs will vary based on tank size and required effluent quality.

FIBERGLASS OIL/WATER SEPARATOR SPECIFICATIONS

Specifications for Oil/Water Separators (Single-Wall and Double-Wall) Models CSI-10, CSI-15

Specifications for the UL 2215 model or oil/sand/grit interceptors are available upon request.

Short Form:

The contractor shall provide fiberglass underground Oil/Water Separators, in types (single-wall or double-wall) and sizes as shown on the drawings. The separators shall be manufactured by Containment Solutions.

Separators shall be tested and installed with pea gravel or crushed stone or approved alternate backfill material, according to the current installation instructions (Containment Solutions' Pub. No. OWS 2013 provided with the tank).

Long Form:

Guide Specification: Containment Solutions' Fiberglass Underground Oil/Water Separator.

Part I: General

1.01 Related Word Specified In other Sections

- A. Cast-in-place concrete: Section 03300
- B. Anchor Bends: Section 05501
- C. Plastic Pipe: Section 15064
- D. Other related work-such as excavation, concrete or steel piping

1.02 Quality Assurance

- A. Acceptable manufacturer - Containment Solutions, Inc., Conroe, Texas
- B. Governing Standards (UL 1316):
 1. The API manual on disposal of refinery wastes.
 2. API bulletin no. 1630 first edition.
 3. API bulletin no. 421.
 4. Tank manufactured per ASTM D-4021.
 5. Tank must meet National Fire Protection Association (NFPA 30) Flammable and Combustible Liquids Code.
 6. EPA Test Methods 413.1 & 413.2

1.03 Submittals

- A. Shop Drawings: Contractor shall submit _____ copies of shop drawings for each separator. Drawings shall include all critical dimensions and locations of all fittings and accessories. Material of construction shall be in accordance with section 1.02 of this specification.
- B. Catalog Data: Contractor shall submit _____ copies of manufacturer's literature.
- C. Installation Instructions: Contractor shall submit _____ copies of manufacturer's installation instructions.
- D. Operation and Maintenance Manual: Contractor shall submit _____ copies of manufacturer's operation and maintenance manuals.

Part II: Products

2.01 Single-Wall or Double-Wall Fiberglass Oil/Water Separator

- A. Loading conditions - Tank shall meet the following design criteria:
 1. External hydrostatic pressure: Buried in ground with 7' of overburden over the top of the tank, the hole fully flooded and safety factor of 5:1 against general buckling. (Contact CSI for deeper burial depths.)
 2. Surface loads: When installed according to manufacturer's installation instructions, tanks will withstand surface H-20 axle loads (32,000 lbs./axle).
 3. Internal load: Primary and secondary tanks shall withstand 5 psi air pressure test with 5:1 safety factor.
 4. Tanks shall be designed to support accessory equipment such as manway extensions, drop tubes, etc. when installed according to manufacturer's recommendations and limitations.
- B. Product Storage:
 1. All primary tanks must be vented. Tanks are designed for operation at atmospheric pressure only.

2. Tanks shall be capable of storing liquids with specific gravities up to 1.1.
 3. Tank shall be capable of storing grease and oils at temperatures not to exceed 150°F.
 4. Tanks shall be inert to petroleum products.
 5. Coalescer plates and associated internal mounting hardware shall be rustproof.
 6. Tanks laminate shall consist of inert material with less than 1% moisture content.
 7. Coalescer plates shall be horizontal, parallel plate design.
 8. Coalescers shall be constructed of oleophilic material.
- C. Capability and Dimensional Requirements (refer to Containment Solutions' literature on gallonage).
1. Nominal volume of the separator shall be _____ gallons.
 2. Intermittent flow rate shall be 0 to _____ GPM.
 3. Total spill capacity shall be _____ gallons.
 4. Inlet oil specific gravity shall range between _____ and _____.
 5. Effluent discharge quality shall be _____ ppm free oil and grease.
 6. Nominal outside diameter of the separator shall be _____ feet.
 7. Nominal outside diameter of the tank shall be _____ feet.
- D. Monitoring Capabilities (Double-Wall Tanks Only):
1. Tanks shall have a space between the primary and secondary shell walls to allow for the free flow and containment of all leaked product from the primary tank.
 2. The following continuous monitoring conditions shall be compatible with the cavity between the inner and outer tanks:
 - Vented to atmosphere
 - Vacuum - 10.2" Hg maximum
 - Positive air pressure (3 psi maximum)
 - Hydrostatic pressure - 7 foot maximum groundwater head pressure over tank top.
 3. Tanks shall have an integrally mounted reservoir installed on the tank for optional hydrostatic monitoring. The reservoir shall be constructed of fiberglass reinforced plastic materials and warranted for 30 years against failure due to internal/external corrosion and, when properly installed, against structural failure (same as tank warranty).
 4. Tanks shall be designed with one 4" fitting that will access the tank bottom between the primary and secondary walls (annular space).
 5. The double-wall tank monitor shall be capable of detecting a breach in the inner and/or outer tank under the following installed conditions:
 - a. When the inner tank is empty.
 - b. When the inner tank is partially or completely full and the groundwater table below the tank bottom.
 - c. When the inner tank is partially or completely full and the tank is partially or completely submerged in groundwater.
 6. The leak detection performance of the monitoring system shall be tested and verified by a qualified independent consultant to detect leaks as small as 0.10 gallons per hour from either wall under all groundwater conditions.
 7. All monitoring equipment, including FRP reservoirs and electronic control, shall be UL-Listed.
 8. If hydrostatically monitored, any solution used in the tank annular space shall have UL approval for compatibility with the tank and be a contrasting color to the tank surface to facilitate visual inspection of the tank for leaks prior to burial.

2.02 Accessories

- A. Flanged Nozzles
 1. Inlet and outlet nozzles shall be of fiberglass or PVC construction. The nozzles shall have standard 150# ANSI Flange.
 2. Nozzles shall be of sufficient size for inlet flow rate.

FIBERGLASS OIL/WATER SEPARATOR SPECIFICATIONS

B. Fittings Threaded-NPT

1. All threaded fittings shall be located in a manway lid or a tank mount and be constructed consistently with the requirements of the UL Label. Fittings to be supplied with threaded cast iron plugs.
2. All standard threaded fittings to the primary tank and monitoring cavity are 4" in diameter. All standard threaded fittings are half-couplings. Reducers are to be used for smaller sizes where specified and provided by contractor.
3. Thread Standards - All threaded fittings shall have machine tolerances in accordance with the ANSI standard for each fitting size.
4. Strength - NPT fittings will withstand a minimum of 150 foot-pounds of torque and 1,000 foot-pounds of bending, both with 2:1 factor of safety.
5. Location - refer to drawings for location.
6. All rigid internal piping shall be terminated at least 4" from the bottom of the tank.

C. Flanged Manways:

1. One 29" oval or one 30" round manway will be provided with each separator. 4' and 6' diameter separators greater than 3,000 gallon total capacity will also include on 22" flanged manway. 8' and 10' diameter separators greater than 6,000 gallons will also include one 22" manway.
2. All manways will be furnished complete with UL-Listed gaskets, bolts and covers.
3. Location - refer to drawing for location.
4. Fiberglass containment collar and turbine enclosure shall be provided for primary manway. Manway extensions shall be provided for 22" manways.

D. Secondary Containment Collar - The secondary containment collar shall be constructed of fiberglass reinforced plastic. Collar shall be 42" or 48" in diameter and will be factory-installed in accordance with drawings.

E. Optional Oil/Water Separator Monitor & Electronic Accessories

1. Electronic Control Panels - The control panel shall be constructed of UL-Listed, electronic components. The control panel power source is 120 volts A.C. (contractor provided wiring). The sensor monitoring circuit is an intrinsically safe circuit, i.e., the circuit incapable of releasing sufficient electrical or thermal energy to cause ignition of specific hazardous material under "normal" or "fault" operating conditions. The control panel shall be capable of monitoring single or multiple point oil/water interface sensors and tank interstitial monitor sensors.

Electrical components rating: Weatherproof (NEMA 4 or 4X)

All control panels shall include:

- Alarm lights for each circuit
- Warning Bell
- Panel housing materials of epoxy coated steel
- Alarm bell silence switch
- Containment Solutions' electronics do not require shielded cable

Note: All wiring materials are provided by the contractor. Wiring is required from the power source to the control panel to the probe assembly.

2. Oil/Water Interface Sensors

Specifications:

Single or multiple point sensors shall be designed to provide monitoring of the oil/water interface and to provide accessory control. Brass models and stainless steel models are available.

3. Reservoir sensor - is detailed in section H2 of the specification.

F. Optional Anchor Straps - Provide glass fiber-reinforced plastic anchor straps for each tank shown. Number and location of straps shall be as specified by manufacturer. Each strap shall be capable of withstanding the buoyancy load for tank diameter as shown:

4'0	-	4,200 Lbs.
6'0	-	18,000 Lbs.
8'0	-	25,000 Lbs.
10'0	-	25,000 Lbs.

Straps shall be standard as supplied by the tank manufacturer.

G. Tank Lifting Lugs - Provide lifting lug (s) on all tanks. Lifting lug system shall be capable of withstanding weight of tanks with a safety factor of 3:1.

H. Optional Hydrostatic Monitor Accessories

1. Brine Antifreeze

Brine Solution Designation: BAS-30

Chemical Composition: 30%+ calcium chloride, 1% to 3%

Potassium chloride, 1% to 2% sodium chloride, balance water

Visual Appearance: Green in color, odorless fluid

Specific Gravity @ 60°F: 1.272-1.317

Factory installed on tanks 30,000 gallon and under. Bulk brine jobsite installed on 35,000 gall and 40,000 gall tanks.

2. Reservoir Sensor - The FHRB 810 reservoir sensor is specifically designed for installation in the reservoirs of CSI double-wall tanks. The components of the sensor are compatible with CSI supplied brine solutions. The sensor is also compatible with any other control panel that accepts normally open or closed switches. The sensor provides two alarm points: high brine and low brine. The sensor can be wired to a control panel to provide only a single alarm (not distinguishing between high or low alarms) or it can be wired to report both alarm conditions. The FHRB 810 reservoir sensor interfaces with Fluid Electronics control panels. See section 2.02 E1 for additional details.

- I. Optional Watertight Turbine Enclosure (Model WTE Series) - The watertight turbine enclosure consists of fiberglass reinforced plastic (FRP) enclosure body (variable length in 12" increments, 42" or 48" ID's), and FRP reducer (42" x 30" or 48" x 30" ID's) with o-ring groove and o-ring gasket, and a push-on FRP lid with two handles. The reducer opening must be large enough (minimum 28") to allow for the removal of a 22" round or 23" x 29" oval manway lid. The lid OD must be small enough to be removed through a 35" street box. The enclosure body must be capable of joining to the 42" or 48" diameter secondary containment collar with a leaktight adhesive joint. The reducer must be capable of joining to the enclosure body with an external leaktight adhesive joint to allow for field installation of the adhesive without enter the enclosure. With the lid installed, the assembly must provide a water tight seal with water up to 12" over the lid. The lid includes a non-skid exterior surface and must be able to support a person standing on the lid without damage to the lid. One of the lid handles is to be offset to aid in the removal of the lid and the other is centered on the lid.

Part III: Installation

3.01,3.02 Installation and Testing

Tanks shall be tested and installed according to the current installation instructions provided with the tank (refer to Containment Solutions' latest version of Pub. INST 6001 and OWS 2013)

Specifications for Containment Solutions' Interceptors (Single-Wall and Double-Wall)

Short Form:

Provide and install ____ Containment Solutions, Inc. (single basin ((or)), double basin ((or)), triple basin) interceptor. Interceptor shall be (single-wall ((or)) double-wall Type II) constructed in accordance with UL 1316. Interceptor shall be ____ diameter and ____ long. Manufacturer shall provide written (30) year external and internal corrosion warranty.

While Containment Solutions has taken every precaution as to the accuracy of content and data presented herein, Containment Solutions cannot be held responsible for the individual interpretation of the data presented, any loss or damage to any property whatsoever, injury or death to any persons whatsoever, or any claims, demands, actions, complaints, proceedings, judgement, losses, damages, compensation, liabilities, costs or charges, however arising from the unauthorized undirected used of this handbook or the data it contains.

CONTAINMENT SOLUTIONS MANUFACTURES:

Underground and Aboveground Storage Tanks

Urea DEF Storage Tanks

Automotive Oil and Lubricant Storage Tanks

Flowtite® Water Tanks

Chemical Storage Tanks

Fiberglass Manholes and Wetwells



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